Factors that Affect Contaminant Occurrence in Public-Supply Wells: Information for Improved Monitoring Strategies

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Biographical Sketch
Sandra Eberts is a Professional Hydrogeologist certified and registered by the American Institute of Hydrology. She has been with the U.S. Geological Survey for over 20 years and is currently team leader of the USGS National Water-Quality Assessment Program Transport of Anthropogenic and Natural Contaminants to Supply Wells (TANC) topical study. Prior to her work on the TANC study, Sandra spent 8 years as a USGS technical liaison to the U.S. Air Force for clean-up of ground-water contamination at weapons manufacturing facilities nationwide.

Abstract
Since 1991, the U.S. Geological Survey National Water-Quality Assessment (NAWQA) Program has studied the occurrence of more than 600 naturally occurring and anthropogenic compounds in drinking-water wells across the Nation, including in untreated water collected from more than 1,100 wells used for public supply. In general, compounds are detected frequently, often in chemical mixtures, but seldom at concentrations likely to affect human health.
The NAWQA Program and many of its stakeholders, including local, State, and federal governmental agencies, drinking-water suppliers, and non-governmental organizations, recognized the need to better understand why certain compounds occur in public-supply wells and to develop an enhanced scientific basis to support improved drinking-water monitoring and protection strategies. The Program, therefore, implemented an intensive study focused on understanding factors that affect the movement and fate of contaminants and vulnerability of public supply wells. The study uses nationally consistent protocols for sampling and analysis in nine areas across the Nation representing different environmental and hydrologic settings. Because subsurface processes and management practices differ among aquifers and public-water systems, public-supply wells in different areas of the Nation are not equally vulnerable to contamination, even where there are similar contaminant sources. However, study findings to date show that mixing of water in wells, short circuiting of expected flow paths to wells, and geochemical conditions in the surrounding aquifer affect the movement and fate of contaminants and vulnerability of public-supply wells to varying degrees in all areas studied.